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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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Carsten Steger

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09/09/2004

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EXAMINER

CHANG, JON CARLTON

ART UNIT

PAPER NUMBER

2623

DATE MAILED: 09/09/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/965,236

Applicant(s)

STEGEER, CARSTEN

Examiner

Jon Chang

Art Unit

2623

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-21 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-21 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 26 September 2001 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☒ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 9/26/01, 8/13/02.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: ____.

Claim Objections

1. Claims 7, 8, 9, 12 and 21 are objected to because of the following informalities:

a) In claim 7, at line 1, the word, "further" should be inserted between "(ii)" and "comprises".

b) In claim 8, at line 1, the term "(ii)" should be changed to "(ii)").

c) In claim 9, at line 1, the word, "further" should be inserted between "(f)" and "comprise".

d) In claim 12, at line 1, "methods" should be changed to "method".

e) In claim 21, at line 2, "methods" should be changed to "method".

Appropriate correction is required.

Specification

2. The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter. See 37 CFR 1.75(d)(1) and MPEP § 608.01(o). Correction of the following is required: the specification does not provide antecedent basis for the system of claim 19.

Drawings

3. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the features of claims 19-21 must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 101

4. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

5. Claim 21 is rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. A computer program, *per se*, is considered functional descriptive material, and is therefore non-statutory subject matter.

Claim Rejections - 35 USC § 112

6. Claims 1-19 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

a) In claim 1, at line 2, "the model object" lacks proper antecedent basis. See also claim 19.

b) In claim 1, at lines 4-5, "the search space" lacks proper antecedent basis. See also claim 19.

c) In claim 1, at lines 5-6, "the original image" lacks proper antecedent basis. See also claim 19.

d) In claim 1, at line 7, "the object" is vague. Does this refer to "the model object?" See also claim 19.

e) In claim 1, at line 22, "the model" is ambiguous. Does it refer to the "model object" of line 2, or the "precomputed model" of line 8? See also claim 19.

f) In claim 6, "a resolution better than the finest discretization level" is vague. Does the term "better" mean "higher"?

g) In claim 3, last line, "the list of transformed models" lacks antecedent basis.

h) Claims not mentioned specifically depend from indefinite antecedent claims.

Claim Rejections - 35 USC § 102

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

8. Claims 1, 3 and 19-21 are rejected under 35 U.S.C. 102(b) as being anticipated by the article, "Multi-Resolution Search with Active Shape Models" by Cootes et al. (hereinafter "Cootes").

The following rejection is based on the Examiner's best understanding of the claims in light of the rejection under 35 U.S.C. § 112, second paragraph

Regarding claim 1, Cootes, discloses a method for recognizing an object in an image comprising the steps of:

(a) acquiring in electronic memory an image of the model object (section 1, second paragraph; the method is implemented in a computer, section 4, first paragraph, which inherently has an electronic memory);

(b) transforming the image of the model object into a multi-level representation consistent with a recursive subdivision of the search space, said multi-level representation including at least the original image (section 3, first paragraph; the search space is the image, and the multi-resolution pyramid is a recursive subdivision of the image);

(c) generating at least one precomputed model of the object for each level of discretization of the search space, said precomputed model consisting of a plurality of points with corresponding direction vectors, said points and direction vectors being generated by an image processing operation that returns a direction vector for at least each model point (section 2; section 3, first and second paragraphs, especially the second sentence of the second paragraph);

(d) acquiring in electronic memory a current image (section 4, first paragraph; the electronic memory is inherent in the computer);

(e) transforming the current image into a multi-level representation consistent with a recursive subdivision of the search space, said multi-level representation including at least the original image (section 4);

(f) performing an image processing operation on each transformed image of the multi-level representation that returns a direction vector for a subset of points within said image that corresponds to the range of translations for which the model should be searched (section 2; section 4; note that the movement of the model points toward new points implies a direction vector);

(g) computing a match metric that uses the direction information of the model and the transformed image for all possible poses of the model in the coarsest discretization level of the search space (section 2, note the pose for each update, and "best match"; section 3; Fig.2, "best fit" implies a match metric which is need to assess the fit);

(h) determining those model poses whose match metric exceeds a user-selectable threshold and whose match metric is locally maximal, and generating a list of

instances of the model in the coarsest discretization level of the search space from said poses and said match metrics (section 3, third and fourth paragraphs; note the text, "when this proportion rises above a limit, say 95%..." The limit is the threshold, and the wording of the text implies that it is user selectable; note that the fit is assessed at five locations, and best fits recorded, which would correspond to the claimed list of instances.);

(i) tracking said instances of the model in the coarsest discretization level of the search space through the recursive subdivision of the search space until the finest level of discretization is reached (section 3, third paragraph); and

(j) providing the pose of the instances of the objects on the finest level of discretization (section 2; section 3, third paragraph).

As to claim 3, Cootes discloses the method of claim 1, wherein for each level of the discretization according to step (b) the following steps are performed:

(c1) performing feature extraction in the image of the current level of discretization (section 3, third and fourth paragraphs, examination of the best fit requires a feature extraction); and

for each transformation in the discretized search space at the current level of discretization:

(c2) transforming the extracted model points and direction vectors by the current transformation (section 2; section 3, third and fourth paragraphs); and

(c3) adding all transformed model points along with their transformed direction vectors to the list of transformed models (Fig.2).

Claim 19 is drawn to a system corresponding to the method of claim 1. The discussion provided above for claim 1 is applicable to claim 19. The system including the various means for implementing the method is the Sun Spac10 Workstation, described in section 4, first paragraph).

Regarding claim 20, the examiner wishes to point out that while the claim refers to claim 1, the limitations of claim 1 are not required by the claim. In other words, claim 20 does not require that the computer program product actually perform the method of claim 1. The language, "for performing the method of claim 1" is considered an intended use statement. In intended use situations, all that is required is that the prior art be capable of performing the method. The Sun Sparc10 Workstation, described in the first paragraph of section 4, inherently includes a computer program product comprising program code means. The workstation (and thus the computer program product) is capable of performing the method of claim 1. Additionally, the program codes means would actually perform the method of claim 1 since the method is disclosed by Cootes (see discussion above for claim 1).

Regarding claim 21, see the discussion above for claim 20. The Sun Sparc10 Workstation inherently includes a computer program.

Allowable Subject Matter

9. Claims 2 and 4-18 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

References Cited

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

U.S. Patent 4,799,270 to Kim et al. discloses a hierarchical and recursive system for classifying, identifying and analyzing images, wherein a digital image is partitioned into subarrays.

U.S. Patent 5,323,470 to Kara et al. discloses a method and apparatus for automatically tracking an object, which utilizes a pyramid architecture for image representation.

U.S. Patent 6,546,137 to Lai et al. discloses a search hierarchy system for object localization, which finds the best match of a template in an input image.


"Model-Based Pose Estimation Using Genetic Algorithm" by Toyama et al. teaches a technique for estimating the pose of a model in an image of a scene.

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jon Chang whose telephone number is (703)305-8439. The examiner can normally be reached on M-F 8:00 a.m.-6:00 p.m..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amelia Au can be reached on (703)308-6604. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Jon Chang
Primary Examiner
Art Unit 2623

Jon Chang
September 6, 2004